

# EXHIBIT 18



US008190223B2

(12) **United States Patent**  
**Al-Ali et al.**

(10) **Patent No.:** **US 8,190,223 B2**  
(45) **Date of Patent:** **May 29, 2012**

(54) **NONINVASIVE MULTI-PARAMETER  
PATIENT MONITOR**

(75) Inventors: **Ammar Al-Ali**, Tustin, CA (US); **Joe Kiani**, Laguna Niguel, CA (US); **Mohamed Diab**, Mission Viejo, CA (US); **Greg Olsen**, Irvine, CA (US); **Roger Wu**, Irvine, CA (US); **Rick Fishel**, Orange, CA (US)

4,157,708 A 6/1979 Imura  
4,167,331 A 9/1979 Nielsen  
4,266,554 A 5/1981 Hamaguri  
4,267,844 A 5/1981 Yamanishi  
4,446,871 A 5/1984 Imura  
4,531,527 A 7/1985 Reinhold, Jr. et al.  
4,586,513 A 5/1986 Hamaguri  
4,621,643 A 11/1986 Newet al.  
(Continued)

#### FOREIGN PATENT DOCUMENTS

(73) Assignee: **Masimo Laboratories, Inc.**, Irvine, CA (US)

EP 41 92 23 3/1991  
EP 0 569 670 2/1993  
EP 0569670 11/1993  
(Continued)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1661 days.

#### OTHER PUBLICATIONS

(21) Appl. No.: **11/367,033**

International Search Report for PCT/US2006/007516, mailed on Jan. 11, 2007, in 4 pages.

(22) Filed: **Mar. 1, 2006**

(Continued)

(65) **Prior Publication Data**

US 2006/0226992 A1 Oct. 12, 2006

*Primary Examiner* — Eric Winakur

*Assistant Examiner* — Marjan Fardanesh

(74) *Attorney, Agent, or Firm* — Knobbe Martens Olson & Bear LLP

#### Related U.S. Application Data

(60) Provisional application No. 60/657,596, filed on Mar. 1, 2005, provisional application No. 60/657,281, filed on Mar. 1, 2005, provisional application No. 60/657,268, filed on Mar. 1, 2005, provisional application No. 60/657,759, filed on Mar. 1, 2005.

(51) **Int. Cl.**

**A61B 5/1455** (2006.01)

(52) **U.S. Cl.** ..... **600/310; 600/323; 600/324; 600/326**

(58) **Field of Classification Search** ..... **600/309-344**  
See application file for complete search history.

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

3,910,701 A 10/1975 Henderson et al.  
3,998,550 A 12/1976 Konishi et al.  
4,014,321 A \* 3/1977 March ..... 600/319

(57)

#### ABSTRACT

Embodiments of the present disclosure include a handheld multi-parameter patient monitor capable of determining multiple physiological parameters from the output of a light sensitive detector capable of detecting light attenuated by body tissue. For example, in an embodiment, the monitor is capable of advantageously and accurately displaying one or more of pulse rate, plethysmograph data, perfusion quality, signal confidence, and values of blood constituents in body tissue, including for example, arterial carbon monoxide saturation ("HbCO"), methemoglobin saturation ("HbMet"), total hemoglobin ("Hbt"), arterial oxygen saturation ("SpO<sub>2</sub>"), fractional arterial oxygen saturation ("SpaO<sub>2</sub>"), or the like. In an embodiment, the monitor advantageously includes a plurality of display modes enabling more parameter data to be displayed than the available physical display real estate.

**47 Claims, 18 Drawing Sheets**

